...information for the Defense modeling and simulation community...

DMSO NEWS

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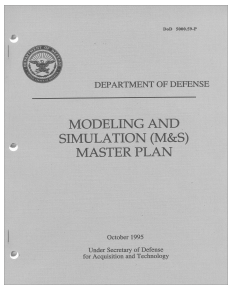

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'WARMOND'

Warfighters get reinforcements

By Jim Quinlan
DMSO Warfighter Division

In a time of increasing operational tempo and decreasing assets, warfighters can use all the help they can get. Modeling and simulation (M&S) can provide some of that help. The problem is in understanding the warfighter's M&S needs in such a way that the right technology can be applied.

"Lead, Integrate, and Leverage warfighter capabilities" are not just words to the Defense Modeling and Simulation Office (DMSO). The DMSO realizes in order to assist the warfighter it must first develop a mechanism for capturing the warfighter's M&S needs ensuring they are represented and interpreted correctly.

During the summer and fall of 2000, a team from the Modeling and Simulation Information Analysis Center (MSIAC) interviewed representatives from various Commander-in-Chief (CINC) organizations and asked them to identify their primary M&S needs. The intent of these interviews was to get a snapshot of M&S end-user (aka "warfighter") needs to form a baseline that would be continuously updated. A version of this warfighter needs assessment is available on the MSIAC Web site at *www.msiac.dmso.mil/ms_needs/documents.asp*.

The warfighter needs identified in the assessment have since been entered into the *Warfighter M&S Online Needs Database*, or *WARMOND*, and will soon be accessible via the Web. WARMOND will provide a database of the community's M&S needs. It has the capability to evolve as warfighters' priorities change. It will allow warfighters to find organizations with like M&S needs and highlight current programs in place to address those needs. Additionally, it provides a tool to assist the DMSO in directing its resources and programs to support warfighters' M&S needs. When completed, WARMOND will also be able to draw linkages between functionally oriented needs submitted by warfighter organizations and technical needs derived from them. This will allow the M&S technical community to focus time and attention on technical challenges that could have the greatest benefit to a wide number of functional needs. In its final version, WARMOND will provide a "Yahoo-like" information capability for the DoD M&S community.

The Joint Forces Command and the DMSO are currently reviewing how WARMOND could support the formal M&S requirements process among the CINCs. As part of this effort, WARMOND will be demonstrated at the upcoming Joint Training Readiness Group (JTRG) on March 26. Subsequent to that demonstration, authorized users with *.mil* addresses will be able to log onto the system and begin using it. Future versions could potentially allow access to industry and international communities.

Individuals may apply for an account and password at *www.warfighter@msiac.dmso.mil* or by phone at (703) 933-3375.

Executive Forum for M&S set for May 30-31 in Vienna, Va

The 10th annual Executive Forum for Modeling and Simulation will be held May 30-31, at the Sheraton Premiere at Tysons Corner in Vienna, Va.

The program will present the latest modeling and simulation (M&S) trends and developments in the DoD and industry to government/military and industry executives, strategic planners, program managers and senior technical managers. Winners of the 2000 Department of Defense M&S Awards will be recognized on May 30.

The event, formerly the Defense Modeling and Simulation Office (DMSO) Industry Days, is sponsored by the DMSO, the National Training Systems Association (NTSA), and the M&S Industry Steering Group of the National Defense Industrial Association. Online registration is available at *www.trainingsystems.org/events/11D.htm*.

Presentations, M&S Award winners' program descriptions and other conference information will be posted on the DMSO Web site at *http://www.dmso.mil/* prior to the Executive Forum for M&S.

Photo by Steve Wilson, DMSO

Director's Corner

By Colonel Wm. Forrest Crain, U.S. Army

"Updating the DoD M&S Master Plan"

This year will see a change in one of the most important documents in Defense Department modeling and simulation – the *DoD Modeling and Simulation Master Plan.*

In February, the Executive Council for Modeling and Simulation (EXCIMS) endorsed and approved five "objectives" that provide the foundation for the ongoing revision of the master plan. Why is this important? Before I answer, let me put it in context.

The DoD M&S Master Plan, or DoD 5000.59.P, published in October 1995, has faithfully served as the DoD's blueprint for directing, organizing, and concentrating its M&S capabilities and efforts on resolving commonly shared problems. Derived from the DoD M&S Vision, it has provided the foundation for the High Level Architecture implementation, and helped form a range of common services like help desks, M&S education, resource repositories, environmental databases and a host of other initiatives that were important to the DoD. In turn, it has served as the foundational document that all of the DoD Components used to build their own M&S master plans. You can see just how important this document is to funding M&S programs if you think of it from a resource justification point-of-view, and as a tool to focus and organize M&S strategic interests within the entire DoD M&S community.

"The current (DoD M&S Master Plan) was published in 1995. The world has changed since then. Technology has advanced and many ideas have become reality. The way we look at the world and our place in it has changed -- our joint vision looks out to 2010 and 2020. We have a new administration. It's time to rethink our strategy for DoD M&S ..."

The current plan was published in 1995. The world has changed since then. Technology has advanced and many ideas have become reality. The way we look at the world and our place in it has changed – our joint vision looks out to 2010 and 2020. We have a new administration with new priorities. It's time to rethink our strategy for DoD M&S – to refocus our collective attentions, look to the future and refine the strategic outlook for M&S in the DoD. How far into the future? At least six to 10 years in order to influence the long-range funding decisions needed to implement the plan.

Now, back to the EXCIMS-approved "objectives."

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DMSO NEWS

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Director's Corner

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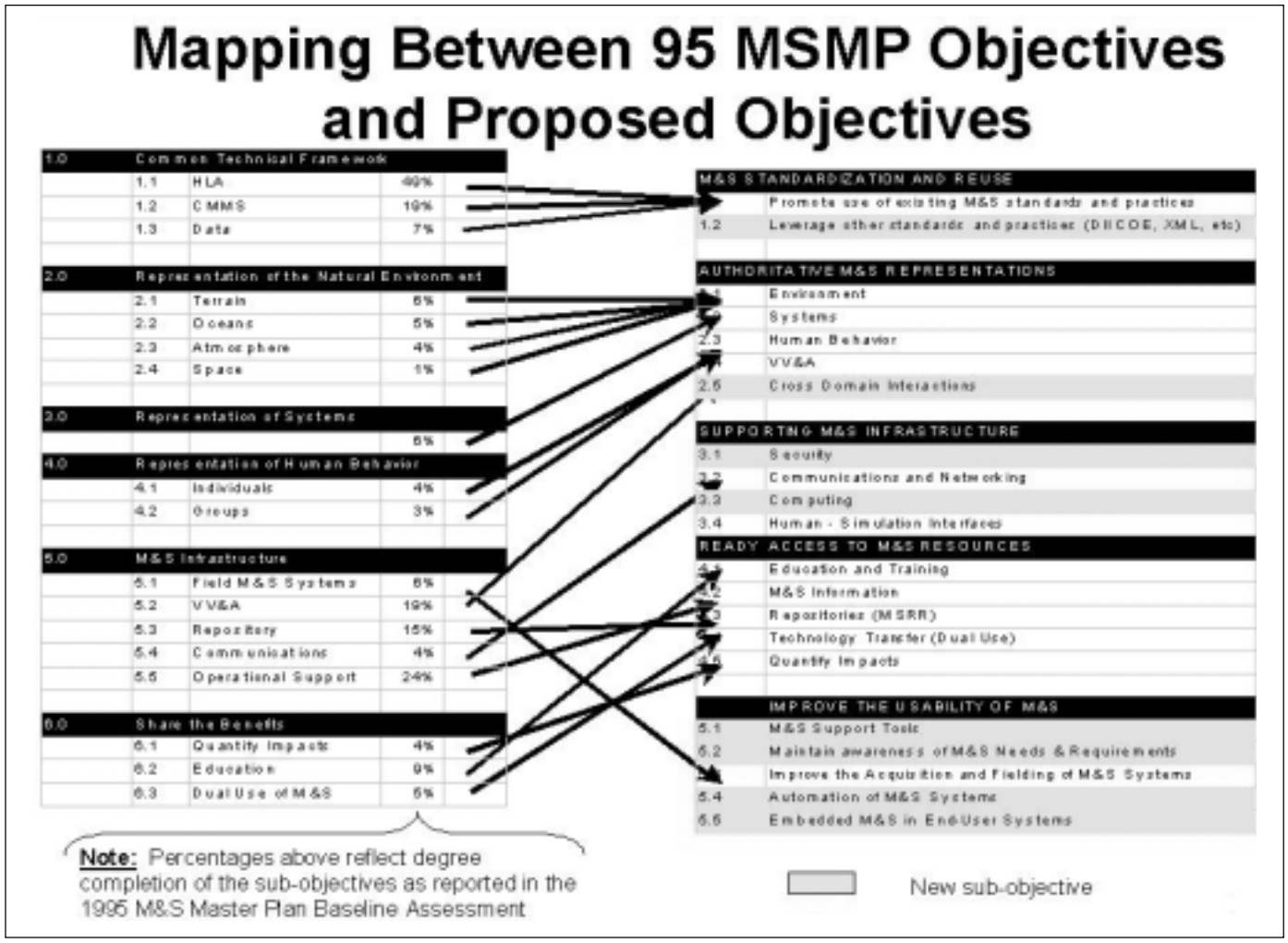


The DMSO and the M&S Information Analysis Center (MSIAC) completed an extensive interview process throughout the "warfighter" community. Our goal was to catalogue the key M&S issues and actions from their perspective. We needed to know what objectives, subobjectives and/or actions from the 1995 M&S Master Plan could be considered "completed," as well as those that required further emphasis or refocus. We needed to know what the most pressing M&S issues were from the warfighter's point-of-view. From the DoD M&S Vision, products of this effort and the many other inputs from the entire DoD M&S community, five objectives were identified to serve as the foundation for the new master plan.

- *M&S standardization and reuse.*
- *Authoritative M&S representations.*
- *Supporting M&S infrastructure.*
- *Ready access to M&S resources.*
- *Improve the usability of M&S.*

Take a look at the chart above. You'll see that while a good number of the subobjectives under these five will map back to the current master plan, there are other, newer yet related subobjectives that help us take those next steps to better supporting the warfighter in the future. Some of these subobjectives are actually "break-outs" from the previous ones. Let me reiterate, the EXCIMS has approved only the five objectives, our concept and timeline for moving forward with this plan. While Gary Yerace, the DMSO Chief of Staff, has the formidable task of putting the new plan together, it and development of the subobjectives is being done with the input and support of the Services and other DoD Components through the EXCIMS' M&S Working Group.

Our intent is that this revision not get down in the weeds. It will be a 15-20 page strategic plan with broad, long-range, measurable objectives from which DoD Components can craft their own supporting plans. Together they will form a "family" of complementary plans.

Our goal is to prepare a draft master plan by April, do an informal staffing through June, present it to the EXCIMS in July for approval for formal coordination, conduct the coordination and negotiations through mid October and publish the revised DoD M&S Master Plan on December 1. That's an aggressive timeline, but a doable one.

Finally, here's a key point. If you carry away only one thing from this, it's the fact that this M&S Master Plan isn't the DMSO's plan. It's the DoD's. Every DoD Component will have had a say in crafting it to meet our collective needs. As it should be.

Respectfully,
Forrest

Enterprise

SEDRIS v3.0.2
Expanded software released on Jan. 25

By Paul Foley
DMSO INE Staff

On January 25, Release 3.0.2 of Synthetic Environment Data Representation and Interchange Specification, or SEDRIS, software was made available for public use. This release greatly expands environmental data representation and interchange capability from the 1999 public release 2.5.2a.

Following several internal releases supporting SEDRIS Associate developers and an extensive test period, Release 3.02 has been placed at the *www.sedris.org* for public access and use. In addition to responding to noted deficiencies in existing capabilities, all the major areas of SEDRIS technology development have been extended in the following ways:

• **Interface Specification**. The level 0 read Application Programmer's Interface (API) and level 0 write API have been unified into a single implementation. Consequently, SEDRIS now provides functions to support the modification of existing transmittals, such as adding new objects, removing objects, and modifying the relationships and/or fields of existing objects. New implementation of Write capability that provides a more efficient use of disk space, consequently, generates smaller transmittals.

• **Spatial Reference Model (SRM)**. Support for an expanded set of coordinate transformations and the various related "chained" coordinate transformations.

• **SEDRIS Transmittal Production and Consumption**. Release 3.02 includes the ability to link SEDRIS transmittals together (known as inter-transmittal referencing (ITR)); this is a substantive conceptual improvement. For example, a simulation moving model library may be created as an independent transmittal, separate from feature data. This transmittal may be used on its own or referenced from database transmittals. Transmittals may also be subdivided by region such that a repair to one area of a database does not require regeneration of the entire transmittal. Production is more easily subdivided, and subsets of the database can be immediately tested as they complete, in contrast to awaiting completion of the entire area. An itr_test utility, which demonstrates the use of ITR, is also provided. The release also includes added support for new SEDRIS transmittal identification resolution based on Uniform Resource Name (URN).

• **Environmental Data Coding Specification (EDCS)**. A large number of new EDCS Classification

See SEDRIS v3.0.2, p. 5

Two SEDRIS projects complete ISO/IEC standards set, JTC assigns project numbers

By Paul Foley
DMSO INE Staff

Joint Technical Committee (JTC) 1 of the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC) recently assigned project numbers to the last two Synthetic Environment Data Representation and Interchange Specification (SEDRIS) Components.

International standards will now be developed for the ISO/IEC Language Bindings, Part 4: ISO C; for the Environmental Data Coding Specification (EDCS) – ISO/IEC 18041; and the Spatial Reference Model (SRM) – ISO/IEC 18042.

These two latter standards join the environmental representation work program of JTC 1 Sub Committee (SC) 24 already consisting of the following SEDRIS Project developed technologies:

- *ISO/IEC 18023 SEDRIS Multi-part Standard*
  - *Part 1: SEDRIS Functional Specification consisting of the Data Representation Model and Interface Specification*
  - *Part 2: Transmittal Format*
  - *Part 3: Transmittal Format Binary Encoding*
- *ISO/IEC 18024 SEDRIS Language Binding*
  - *Part 4: ISO C*
- *ISO/IEC 18025 EDCS*
- *ISO/IEC 18026 SRM*

Working Group 8 of JTC1 SC 24, established to develop SEDRIS ISO/IEC standards, has been making steady progress on these projects. Representatives from the United Kingdom, Germany, Korea, Japan, France, Czech Republic and the United States have participated in the work

See SEDRIS ISO/IEC, p. 5

SEDRIS v3.0.2

Continued from p. 4

Codes (ECCs), EDCS Attribute Codes (EACs), and corresponding EDCS Enumerant Codes (EECs) have been added based on continued assessment of source data (e.g., the Navy Oceanographic – Atmospheric Master Library (OAML)). A number of new codes were input from expanded use of EDCS beyond the SEDRIS interchange mechanism to include the definition of environmental objects exchanged during simulation runtime as used in the DMSO-sponsored Environment Federation using the High Level Architecture.

SEDRIS 3.0.2 also provides backward compatibility because existing 2.5.2 databases may be converted via an included conversion utility.

The SEDRIS Project Team invites your participation in the continued development and international standardization of SEDRIS technologies. To facilitate use of SEDRIS there is a "help" capability available through the SEDRIS Web site and a means to contact SEDRIS project management through email.

For more information

For more information visit the SEDRIS Web site at *www.sedris.org*.

SEDRIS ISO/IEC

Continued from p. 4

program. Focus has initially been of the EDCS and SRM standards. These two technologies are required parts of the SEDRIS Interchange Mechanism but are individually broadly applicable beyond SEDRIS-specific use.

In addition to these international standards development efforts, the Standards Activity Committee of the Simulation Interoperability Standards Organization (SISO) has established product development groups (PDGs) for both the EDCS and SRM to develop supporting product implementations of the technologies. The PDGs are also contributing review comments to the international standards development effort through the United States National Committee for Information Technology Standards.

With all components assigned ISO/IEC numbers, work has commenced to move SEDRIS, the EDCS and the SRM into the main Joint Technical Architecture and into various procurement publications as major contributing technology toward enabling interoperability.

For more information

For more information visit the SEDRIS Web site at *www.sedris.org*.

HLA 'technology transition' will shift responsibilities from DMSO to users, commercial developers

By Chris Turrell
DMSO HLA Staff

During the winter of 1999, the Defense Modeling and Simulation Office (DMSO) announced that the High Level Architecture (HLA) for Simulation would shift its focus from "technical transition" to stabilization of the specification with emphasis on support to HLA implementations. Stabilization of the specification was achieved with the formal adoption of the HLA by the Institute of Electrical and Electronic Engineers (IEEE) in September 2000. This event has enabled the focus to shift again to sustainment of the program with continuing emphasis on support of HLA implementations.

The notion of sustaining the HLA probably conjures up as many mental images as there are people to conceive them, so some further explanation may be necessary. Defining sustainment is probably easiest by stating what it is not. First and foremost, it is not a waiver of commitment by the DMSO or the DoD to the HLA. In fact, commitment to the HLA has recently been strengthened by the signing of the HLA Memorandum of Agreement by the military services and Dr. Jacques Gansler, USD (AT&L). In this memorandum each of the services agreed that the HLA was the architecture of choice for interoperability between simulations and further agreed to publish their own HLA implementation policies.

In the context of the HLA program, sustainment means that the HLA is no longer a research and development (R&D) program, but a product available to the community. New developments will be curtailed and the focus will be on the support of existing software and programs. To the extent possible, programs will be consolidated and the DMSO will focus cadre support on the joint programs, like the Joint Simulation System (JSIMS) and Joint Warfare System (JWARS). An IEEE 1516 Runtime Infrastructure (RTI) and suite of supporting tools will be produced with an emphasis on compatibility with RTI 1.3NG, and future work will be limited to bug fixes. Development of newer, better, faster, stronger products will be left to the individual programs that require them and the commercial market.

In short, the HLA program is going to enter into a state of "technology transition" that will shift responsibilities from the DMSO to the user community and commercial developers. The concept of transition is key to the understanding of how and when this shift will occur. While the activities that I mentioned above are planned and will be carried out, they will be implemented over time so as not to adversely impact current or future developments.

A more detailed explanation of the HLA technology transition plan will be presented at the Spring Simulation Interoperability Workshop (SIW) on March 26 during the Monday morning panel session on this subject. Panel members will consist of representatives from the DMSO, the HLA program, Carnegie Mellon University's (CMU) Software Engineering Institute's (SEI) office specializing in technology transition, DoD HLA users and the commercial sector.

Additional presentations will be made at the European Simulation Interoperability Workshop (Euro SIW) in London in June, and at the Advanced Simulation Technology and Training Conference (SimTecT 2001) in Australia in May.

For more information

For more information contact Chris Turrell at (703) 933-3364 or *cturrell@dmso.mil*.

• HLA Help Desk •

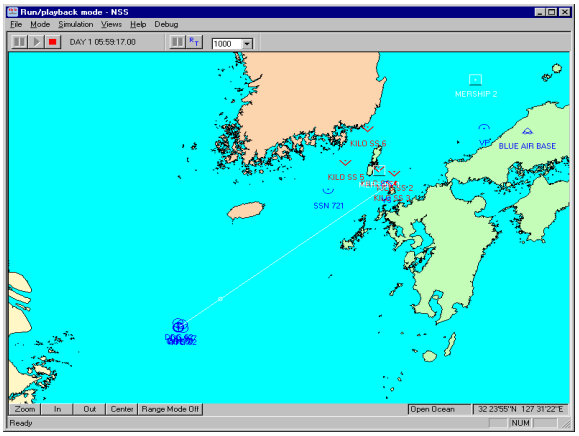
Have a question about the HLA? Send your query to the HLA Help Desk at **hla@dmso.mil**. We'll get you an answer.

Global 2001 exercise will link NSS, GCCS for course of action analysis

By Dave Prochnow
DMSO (MITRE)

Imagine this. You're a naval officer commanding a fleet of ships in hostile waters, perhaps in conjunction with allied forces from other nations. You've been given a mission. It may be to dominate the sea with combat power, or to support a land battle, or even to provide humanitarian relief or evacuation for people in need. Of course, there are enemies who do not want you to accomplish your mission.

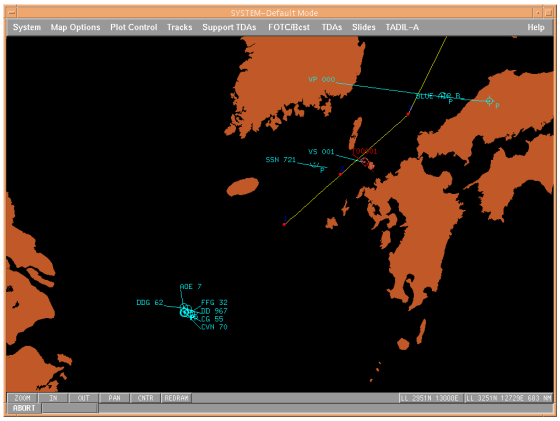
You have a tactical picture of the situation, including a set of enemy tracks. These tracks comprise your perception of the composition and location of hostile forces. You consider several courses of action. You then feed all relevant data, including an automated transmission of data from the tactical display, into a simulation that quickly evaluates each course of action. After analyzing the simulation results, you select a course of action and proceed. Later, as the tactical situation evolves, you will be faced with another dilemma and you will repeat this process. This is a challenging job, but you have confidence knowing that any course-of-action analysis will be based on simulated projections using the most up-to-date data.



Naval Simulation System

The above scenario will be carried out by players at the Naval War College (NWC) *Global 2001* exercise this July. The *Global 2001* exercise will train players from all operational commands of the U.S., as well as from Canada, the United Kingdom and Australia. The NWC players will view tactical data at the BattlespaceNT system, which will be receiving data from the Global Command and Control System (GCCS), a system that is in use throughout the U.S. military.

For the exercise controllers, the GCCS will have the same look and feel as when it is used operationally. The only difference is that instead of receiving real-world data, the GCCS terminal will receive simulated data for the exercise. When a player wants to consider a course of action, he will communicate this information, and, in turn, an exercise controller will select the tracks of interest from the GCCS display via a user-friendly graphical user interface. After a button push, the tactical data will be sent to the Naval Simulation System (NSS). The NSS operator will then supplement the data based on the course of action (COA) under evaluation. The



GCCS Ambassador

operator then executes numerous iterations of NSS, which is stochastic, in order to determine averages and ranges for several measures of effectiveness (MOEs). The exercise player can then make informed decisions based on course of action analysis (COAA), and any new orders will be fed into a larger simulation that drives the exercise.

This will be the first known instance of COAA based on a simulation and a real-world command-and-control system using the Department of Defense (DoD) High Level Architecture (HLA) for simulation. The Defense Modeling and Simulation Office (DMSO) is sponsoring this effort with the participation of Metron, Inc. and the Naval Research Laboratory (NRL). Mertron and the NRL are developers of the NSS and the GCCS HLA interface ("Ambassador") respectively.

In 1999, Metron and the NRL successfully demonstrated an NSS-GCCS HLA linkage, which featured the generation of tracks from NSS displayed onto the GCCS Common Operating Picture (COP). This year, the NRL and Metron will modify the GCCS Ambassador and the NSS, respectively, to allow initialization of the NSS data from the GCCS. The data sent from the GCCS to the NSS will consist primarily of unit locations and track data. After the GCCS has finished sending data, the NSS operator can supplement the data from the GCCS with other initialization data required for the course of action to be tested. The NSS will then execute a series of runs at rates faster than real time. Enough runs will be executed for each COA to obtain statistical significance. Output from the NSS will consist of averages and ranges of pertinent MOEs, displayed in both graphical and textual format. These MOEs may consist of attrition data, force ratios, ship movements and other data important for the COAA.

See NSS-GCCS, p. 9

DIMSS helicopter-ship environment is 'cutting edge'

JSHIP program VV&As its M&S track

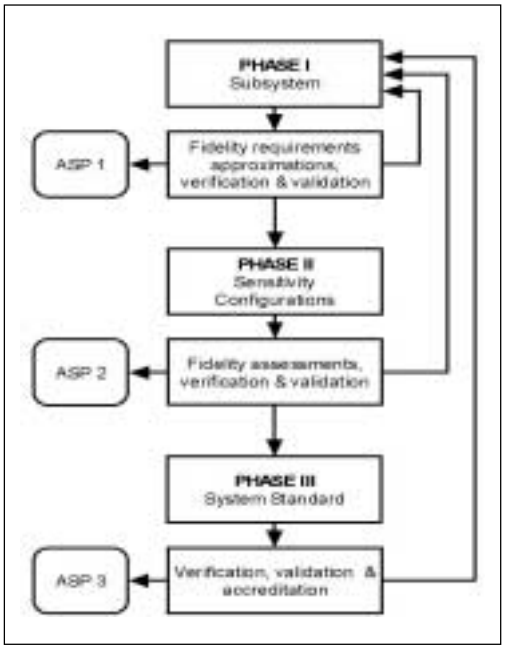
By Mr. Gery VanderVliet
Joint Shipboard Helicopter Integration Process (JSHIP) Program

In 1998, the Office of the Secretary of Defense (OSD), Director, Strategic and Tactical Systems, chartered the Joint Shipboard Helicopter Integration Process (JSHIP) program. The JSHIP is an OSD Joint Test and Evaluation (JT&E) program.

This five-year program was established to increase the interoperability of non-Navy helicopters operating aboard Naval ships and includes a major modeling and simulation (M&S) "track."

The purpose of the M&S effort is to assess, modify, integrate, evaluate and accredit advanced simulation technologies in order to create a pilot-in-the-loop flight simulation that replicates the helicopter-ship environment. The main application of this M&S effort is for flight-envelope development and aircrew training. Viewed as a proof-of-concept, the effort is focused principally on a U.S. Navy amphibious assault ship (LHA) and U.S. Army UH-60A Blackhawk helicopter combination, and is termed the Dynamic Interface Modeling and Simulation System (DIMSS).

The DIMSS as a JSHIP product is comprised of planning, procedures and process documentation, as well as the associated subsystem hardware and software specifically developed for the program. These subsystems include: visual system (five flat-panel screens, mirrors and BARCO projectors), image generator (five SimFusion PCs running the 'X-IG' system), visual models (ship and ocean), ship airwake model (CFD-based turbulent flow data and real-time aerodynamic model integration) and UH-60A aural model. The system is currently installed, fully integrated and flying, at the NASA Ames Vertical Motion Simulator (VMS) located at Moffett Field, Calif.



The simulation of the helicopter-ship environment is cutting edge – there are no existing fidelity standards for this application. Inherent, therefore, in the DIMSS process is the determination of required simulation fidelity – "how good is good enough?" This is being achieved by comparing the performance and workload of the pilot in the aircraft and in the simulator for a range of visual, aural and body force fidelity levels. Each combination of fidelity levels is referred to as a fidelity configuration. Once the fidelity requirements have been established, the chosen subsystem fidelity levels will be integrated and finalized as the System Standard.

Equally important to the program is the verification, validation and accreditation (VV&A) of the system. Since the VV&A and fidelity determination processes are so closely linked, the two have been combined, as depicted in the chart below. The figure shows how the individual subsystems, the sensitivity configurations, and the total system will each undergo separate analyses for verification and validation (V&V). The total system is then accredited for use as a testing tool for flight-envelope development.

Following various DoD guidance, in particular the DoD M&S VV&A Instruction 5000.61 and the DoD Recommended Practices, the VV&A effort is divided into three phases, each supported by an Accreditation Support Package, or ASP. The phases correspond to the V&V assessments of the subsystems (ASP 1), sensitivity configurations (ASP 2), and System Standard (ASP 3), followed by the accreditation of the System Standard (also ASP 3). It is only upon validation of the System Standard that the subsystem fidelity requirements approximated in previous phases are confirmed. Until then, they are merely educated estimates. The process is iterative mainly because the initial estimates of subsystem fidelity requirements are made in isolation and may need to be changed once all the subsystems have been integrated.

The final output of the process, the System Standard, will be defined in terms of a set of fidelity requirements for the subsystems that comprise the simulation. If a system meets them all (i.e. the System Standard is met), its fidelity should be sufficient to satisfy the accredited application of the simulation. The combination of subsystem fidelity levels that produces the System Standard is not unique. Increasing the fidelity of one subsystem may compensate for a deficiency in the fidelity of another subsystem. Therefore, a numerical analysis method, which parallels the fidelity assessment process, is being investigated in which the system fidelity required for the task will be numerically quantified. In this way it will be possible to assess whether simulations that have different 'mixes' of subsystem fidelities will be able to achieve task accreditation.

The VV&A process is comprised of a simulation evaluation, documentation, informal review and feedback, formal review and final recommendation. To support this effort, an independent VV&A committee has been established. The committee chair is defined as the accreditation authority. For the DIMSS, this is the Director of JSHIP, Navy Capt. J. H. Thompson. The members are M&S subject matter experts representing a combination of DoD Agencies, the Defense Modeling and Simulation Office (DMSO), industry and academia, each with specific subsystem or process specialties.

Upon completion of simulation evaluations, results are analyzed and documented in a formal ASP and delivered to each committee member. The members review the ASP and submit informal questions/comments to the committee chair. The M&S team reviews the informal comments and provides any necessary supporting information back to the committee. The committee and the DIMSS team then meet in a formal Accreditation Team Meeting where formal questions and comments are posed to the DIMSS team. Upon answering these questions, the committee makes final recommendations to the Chair to accept or reject the ASP. Each ASP must be accepted prior to formal review of a subsequent ASP and, likewise, each ASP must be accepted for final accreditation.

At this time, the DIMSS effort has completed formal review of ASP 1, and is completing the evaluations and documentation associated with ASP 2. The processes are proving to be extremely effective and efficient. Since the applications associated with the accreditation of the DIMSS affect pilot safety and involve the flight clearance process, the program is intent on completing a rigorous and meticulously documented VV&A effort.

See JSHIP DIMSS, p. 9

'Millennium Edition' of VV&A RPG incorporates user feedback, Build 2 undergoing beta review

By Simone Youngblood
DMSO VV&A Program Manager

The beta review of Build 2 of the DoD Recommended Practices Guide (RPG) – *Millennium Edition* – for verification, validation and accreditation (VV&A) is currently underway.

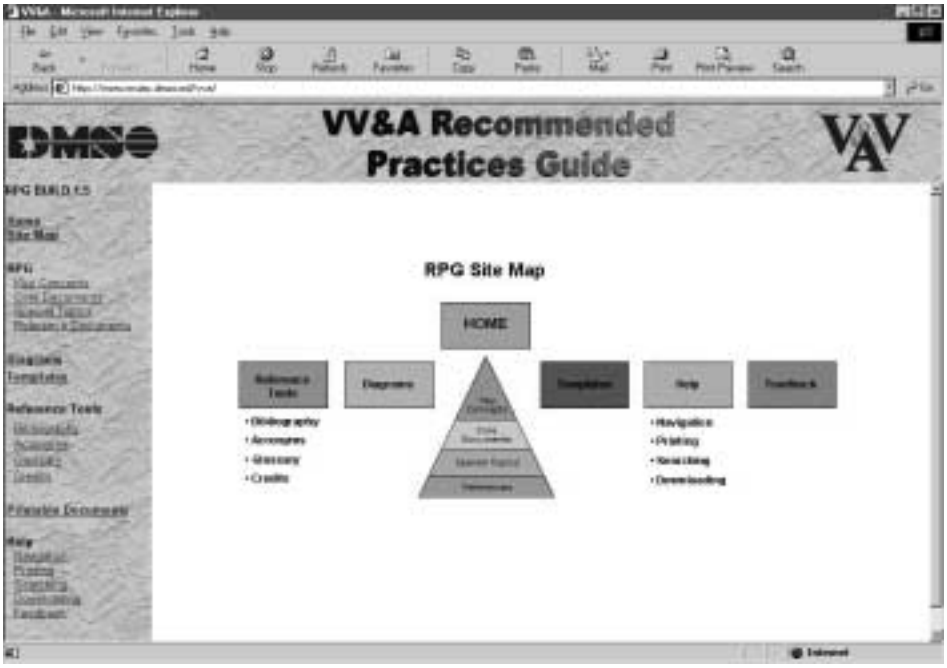
Between 1996 and 1998, the DoD VV&A Technical Working Group (TWG) solicited feedback from the DoD modeling and simulation (M&S) community to determine appropriate ways to increase the utility of the RPG. Recommendations included providing more technical detail, addressing a broader audience and making it easier to find information. An effort was initiated to revise the RPG based on reader feedback. The result is the RPG, the Millennium Edition.

The objectives of the Millennium Edition are threefold:

• First, account for the diversity of audience by tailoring explanations and providing role-specific guidance.

• Second, account for the diversity of situations by tailoring procedures and providing context-specific guidance.

• Third, provide an application-based focus.



VV&A Recommended Practices Guide Web page site map

Based on these objectives, the approach was to implement the Millennium Edition as a web-based document that is multi-tiered, multi-dimensional and reader based. Information is provided for five different functional perspectives (User, M&S Program Manager, Developer, V&V Agent and Accreditation Agent) that address three different simulation categories (New stand-alone, Legacy, and Federation).

The advantages of this approach are important: it allows for greater breadth and depth within the document; it facilitates the addition of information over time; and it allows readers to tailor or build their guidance.

The above grapic depicts the web-based RPG site map. The pyramid in the center illustrates the RPG's information layers. Each successive layer provides an increasing level of detail.

• **Key Concepts.** At the top of the pyramid is the Key Concepts document that provides an introduction to fundamental VV&A concepts which underpin the rest of the RPG.

• **Core Documents.** The Core documents address the VV&A impacts, challenges, and functional tasks for a particular perspective/simulation category combination.

The RPG is being developed as a series of "builds" that map to the simulation categories:

• Build 1 focuses on new M&S development efforts (building from scratch).

• Build 2 will focus on legacy M&S.

• Build 3 will focus on federation M&S.

• **Special Topics.** Special Topics papers address topical issues central to VV&A such as subject matter experts, risk management, & conceptual models.

• **References.** Reference papers are in-depth VV&A-related research papers, many of which were produced in support of professional forums such as SIW and MORS, and have been vetted through the DoD M&S community

The process employed in the development of the Millennium Edition mirrors many of the concepts defined in a robust VV&A process. First requirements were defined and then verified through meetings of the VV&A Technical Working Group. A team of recognized experts and practitioners (SMEs) was assembled to produce the document.

The Alpha version of Build 1 was released in late 1999 to assess the viability of the web-based concept (e.g., down-load time, browser differences, etc.). This constituted our *verification* of the web-based RPG. Having determined that the RPG had been built to the requirements, the next step was to *validate* the content. Therefore, the Beta version of Build 1 was released in March 2000 for a review by a team of two dozen experts in the Services, government agencies, industry, and academia. Reviewers were asked to look for consistency across the documents as well as for any holes in information content. Review comments were tracked and individually addressed. Results of the review and the associated resolution were presented to the VV&A Technical Working Group. This group gave the "thumbs-up" for release of Build 1 which was unveiled at DMSO Industry Days in May 2000.

DoD Instruction 5000.61 (DoDI 5000.61) and DoD VV&A RPG serve as the cornerstones of DoD VV&A policy and guidance. DoDI 5000.61 establishes common terminology and defines high-level roles and responsibilities, while the RPG defines underlying philosophy, principles, and methodologies recommended for use in DoD VV&A efforts. These documents have been used to support the evolution of Service policy and guidance and have been a motivating force in the increased emphasis on VV&A issues.

See VV&A RPG, p. 9

VV&A RPG

Continued from p. 8

The RPG provides core VV&A reference material which has been adopted and adapted by numerous development programs within the DoD, to include the Joint Simulation System (JSIMS), the Joint Warfare System (JWARS), Joint Advanced Distributed Simulation (JADS), and Network Warfare Simulation (NETWARS). The preliminary version of the RPG provided an excellent tutorial on the subject matter. However, as time progressed, the community began to request more detailed treatments of the subject material as well as in-depth assessments of related technical problems (e.g., conceptual models, fidelity).

For more information

For more information visit the VV&A RPG Web site at *www.msiac.dmso.mil/vva*.

NSS-GCCS

Continued from p. 6

After a series of runs for one particular course of action, the NSS operator will have the capability to archive results so that they can be recalled later and compared with other courses of action. In addition, the GCCS user will then be able to send a new set of initialization data to NSS and repeat the process.

The initial interface is designed to be a one-way data feed from the GCCS to the NSS. This is a low-risk approach that will improve the *Global 01* exercise without jeopardizing its success. However, the DMSO has a grander vision of eventually developing a two-way interface where the results of the COA runs are sent back to the GCCS, allowing the training audience to access such data directly from the command, control, communication, computers and intelligence (C4I) systems accessible to them. Furthermore, if this effort is a success, then the ultimate goal will be to embed a COAA capability into the GCCS, so that these analytic capabilities are available to all users of the GCCS.

JSHIP DIMSS

Continued from p. 7

For more information

For more information regarding the JSHIP DIMSS effort contact Mr. Gery VanderVliet (JSHIP) at (301) 866-6029 or *vandgm@ispec.com*, or Ms. Simone Youngblood (DMSO) at (703) 824-3436 or *syoungblood@dmso.mil*.

M&S University

Continued from p. 11

als covering Verification, Validation and Accreditation (VV&A), Human Behavior Representation, and C4I to Simulation. New courses for later in the year include an *Analysis M&S Workshop* and an *Experimentation M&S Workshop*. Continue to check our Web site for updates on these.

FA 57

Mid-career Army officers must choose a "functional area," in addition to their initial career branch (Infantry, Finance, etc.), to enable development and utilization of special skills that the Army needs from its senior officers. Functional Area 57, Simulations Operations, allows Army officers to become simulations experts through institutional education and operational assignments. FA 57 officers are experts in training combat operations using live, virtual and constructive simulations to support training and military operations. The M&S University is assisting the proponent office, the Army Model and Simulation Office (AMSO), to improve the FA 57 education and professional development programs, and with developing and executing a variety of outreach programs and products designed to draw interested persons into this highly competitive specialty.

The Bad News

The Defense Modeling and Simulation Office (DMSO) has previously funded the development of courses and has not charged a registration fee for them. Times change, missions change, and budgets change. The DMSO is starting to phase itself out of the presentation business. In 2002, the DMSO will continue to resource the development of new courses and the maintenance of existing ones, but attendees will have to share the costs of presenting them. We will approach this new challenge gradually. Starting later this year, all non-military or DoD civilians will be asked to share the presentation costs. By the end of the year, all attendees will be asked to contribute. Check our Web site for further details.

Give Us a Call!

The MSIAC's M&S University is busier than ever providing education courses for the M&S community. We can bring any of our courses to you and are happy to tailor them to your needs, both in content and in length. Visit our Web site at *www.education.dmso.mil* or call us at (703) 933-3343/3330. We'd love to bring a course to you.

DMSO MSRR

Continued from p. 10

livery to authorized users. The system includes the ability to ensure that only authorized users are able to discover your information, and obtain your resources, as appropriate. From the DMSO MSRR, users can search a variety of other systems, including the Service and BMDO MSRR nodes.

For more information

For further information contact Mr. Gary Misch at (703) 933-3327 or *gl@msiac.dmso.mil*. Visit the MSRR online at *www.msrr.dmso.mil/*.

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Visit the MSIAC's "M&S Journal Online" at at
http://www.msiac.dmso.mil/journal/

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Your one-stop shop for M&S information and assistance!

The MSIAC is a Department of Defense Information Analysis Center sponsored by the Defense Technical Information Center and the Defense Modeling and Simulation Office.

Its mission is to assist DoD activities in meeting their M&S needs by providing scientific, technical, and operational support information and services.

Contact the MSIAC at (888) 566-7672 or by e-mail at
msiac@msiac.dmso.mil

Concepts Application

Need a Representation of Human Behavior?

'Toolkit' to provide HBR solutions, 'challenge problems' a top priority

By Lt Col Eileen Bjorkman, U.S. Air Force
Chief, Concepts Application Division
and Dr. Phil Barry
Chief, Science and Technology Initiatives Division

Providing authoritative and credible models of human behavior to the modeling and simulation (M&S) community is a top priority at the Defense Modeling and Simulation Office (DMSO). Using the guidelines set forth in the Department of Defense (DoD) Modeling and Simulation Master Plan and the DMSO Vision, the DMSO Human Behavior Representation (HBR) program strives to enhance reuse and interoperability of human behavior and performance models for the constructive, virtual and live simulations used by warfighters and those that support them.

Although a comprehensive theory for describing human behavior that includes cognition, decision making, knowledge acquisition, memory and performance moderators has not yet been developed, we feel there are many existing modeling techniques mature enough to use in current combat simulations. Our vision is to make these techniques widely available to the M&S community in an environment that would provide for ready access and straightforward integration. We see the first step in this process as developing a web-based toolkit that M&S developers and users can access to help populate their current models and simulations with authoritative HBR. The toolkit will include algorithms; models; certified data for validating models; verification, validation and accreditation (VV&A) procedures; functional descriptions of the missions space; integration and visualization tools, a description of "best practices" for using the toolkit; and a web-based system for accessing toolkit upgrades and technical support.

Many potential HBR techniques appear to be "ready for prime time." However, these techniques have frequently been developed for specific problems in customized environments. To baseline the performance of these techniques and begin to understand how flexible they are at solving various problems, we decided to conduct a series of ongoing "challenge problems." The challenge problems will bring the HBR representations into different combat domains and evaluate their potential for use in existing simulations, as well to examine them for potential inclusion in the toolkit.

The Fiscal Year 2001 challenge problem will use the *Aquarius* federation developed at SPAWAR to provide a prototype testbed. We are developing three vignettes – one each from the air, land, and maritime domains – that will be focused, technically manageable and at the tactical level. Five HBR modeling approaches have been identified for integration into the testbed. We plan to evaluate behaviors such as hierarchical decision making, use of doctrine and TTPS, cooperative behaviors and evolving behaviors. Next year we will extend the challenge problem by including additional models and vignettes, and evaluating selected human performance moderator functions as well.

We hope to be able to present the initial results of this year's challenge problem at the Interservice and Industry Training, Simulation and Education Conference (I/ITSEC) in November. Regardless of the outcome, we are sure to learn a lot from this process!

For more information

For more information, contact Lt Col Eileen Bjorkman, HBR Program Manager and Chief, Concept Applications Division, or Dr Phil Barry, Chief, S&T Initiatives Division at (703) 998-0660.

DMSO MSRR adds updated joint model listings

By Gary Misch
DMSO MSRR Project Lead

The Defense Modeling and Simulation Office's (DMSO) Modeling and Simulation (M&S) Resource Repository (MSRR) has recently updated its listings of joint models in cooperation with JCS (J-8). The MSRR now contains listings and descriptions of most models and tools in current use for joint planning, analysis, and experimentation.

The MSRR also now hosts listings of commercial M&S resources of interest to the DoD M&S community. These listings are not limited to those commercial products currently in use within DoD. The system will list any products that have potential use to the community. If you wish to list or host your model, simulation or related product in the DMSO MSRR, please contact Mr. Gerry Frazier at (703) 933-3314 or *gfrazier@msiac.dmso.mil*.

The M&S Information Analysis Center (MSIAC) is embarking on a major MSRR content revision, with the aim of building complete "simulation biographies" of those resources that are key to critical DoD M&S activities, such as the Quadrennial Defense Review (QDR) or joint experimentation. If you are a current or previous user of a model, simulation or associated tool used within the joint community, or of potential interest for activities such as the QDR or experimentation, the MSIAC would like to have the benefit of your experience. Please contact Mr. Mike Meehan at (703) 933-3326 or *mmeehan@msiac.dmso.mil*.

The MSRR provides a secure method of cataloging information of interest to the M&S community. Additionally, the system can store actual digital resources for de-

See DMSO MSRR, p. 9

Arming the warfighter with M&S knowledge

M&S University continues to expand course offerings; unfortunately, training will come at cost later this year

By Morris Decker
M&S University
and Tom Stanford
DMSO M&S Education Program Manager

New courses, new tutorials, new lessons, a new distributed learning product. The Modeling and Simulation Information Analysis Center's (MSIAC) Modeling and Simulation (M&S) University offers these exciting opportunities, all designed to improve warfighter knowledge of M&S in training, analysis, acquisition and experimentation. A warfighter M&S course, new M&S Staff Officer Course (MSSOC) lessons, "M&S Basics" in distributed learning format, a Computer-Assisted Exercise (CAX) Workshop and restructuring of the M&S education curriculum all provide warfighters with newer and more dynamic M&S education opportunities.

Morris Decker
M&S University instructor

New Web Site

Take a look at our new, restructured Web site at *http://www.education.dmso.mil/*. It contains information on all of our new courses and workshops, and the information that has been the mainstay of the MSIAC's educational program. A course catalog will now guide you through our courses. You may check out a course to see if it fits your needs. You can browse our new calendar of education events. You may use a "reading room" to quietly progress through our distributed learning product. Still available are the MSSOC registration functions and other information needed to sign up for a course or request one of our other products.

The Web site also provides links to other M&S resources, current and past minutes and information from the M&S Education Working Group (MSEWG), and faculty bios.

New Courses

• **Warfighter M&S Course**. Development of a one-day *Warfighter M&S Course* is currently underway. The course will provide warfighters with a perspective on the capabilities that M&S offers to enhance mission capabilities in the training, analysis, acquisition and experimentation functional areas. The course will provide broad perspectives on M&S use in support of mission activities in each functional area. An end-of-course exercise, which focuses on a multi-role scenario, will engage attendees in developing an integrated view of M&S to support the National Military Strategy. Contact us for more details.

• **MSSOC**. The venerable and highly popular *MSSOC* has gotten a facelift. We've added new lessons on M&S in support of each of the three functional areas, as well as experimentation. Continuously updated information, new videos, new speakers, and new panel members all contribute to make MSSOC the best course available anywhere for newcomers to M&S or for M&S veterans interested in expanding their knowledge of the community. There are four DMSO-sponsored MSSOCs remaining in 2001:

- *April 2-5 at the DMSO*
- *Sept. 10-13 at the DMSO*
- *Nov. 5-8 at the DMSO*
- *Dec. 10-13 in Orlando.*

Register for one at the M&S Education Web site at *www.education.dmso.mil* today or call us about bringing the MSSOC to your organization!

• **CAX Workshop**. Does your organization participate in computer-assisted exercises (CAX)? Have you got some new folks that have not done this before and need information on how to set up and run a CAX? Talk with us about our *CAX Workshop*. In two days we'll have your team ready to go for your next big exercise.

• **Training M&S Workshop**. Our newest "millennium" course is the *Training M&S Workshop*. This one-day workshop walks students through the planning, execution, and after action phases of M&S training events. A constructive simulation event is used during the workshop to allow students to wear the hats of planner, trainer, training audience member, and analyzer. This workshop is now available for your unit. Contact us for more information.

Photos courtesy of MSIAC

Michelle Bevan
M&S University instructor

• **Acquisition M&S Workshop**. The *Acquisition M&S Workshop* (formerly known as the PMO M&S Workshop) has been restructured to better fulfill the needs of the acquisition community. Attendance at the workshop has increased by 50% over previous years from our efforts to make it more relevant to specific programs and services. So far this year we have presented it at the U.S. Marine Corps Combat Development Command, U.S. Army Tank Automotive Command, and Brooks Air Force Base. Enthusiastically received at each site, the Acquisition M&S Workshop is also available for your organization.

Call us about it!

On the Drawing Board

This is a busy year for new course development. In addition to the new courses mentioned above, we'll be starting soon on tutori-

See M&S UNIVERSITY, p. 9

M&S University offers new weeklong series of courses

Photos courtesy of MSIAC

Students participate in a recent M&S Staff Officer Course, or MSSOC, at the DMSO in Alexandria, Va.

By Tom Stanford
DMSO M&S Education Program Manager

Are you:

- *New to modeling and simulation (M&S) and need a quick course on what this business is all about?*
- *A veteran of the M&S wars and wish to expand your knowledge beyond the field you work in?*
- *Recently assigned to a job that requires you to know something about M&S?*
- *In need of a better understanding of M&S in order to provide better support to your government customer?*

Have you noticed that there are no Defense Modeling and Simulation Office (DMSO)-sponsored M&S Staff Officer Courses (MSSOC) this summer?

Michelle Bevan, instructor, demonstrates a driving simulator for MSSOC students at the Institute for Defense Analyses' Simulation Center.

Don't panic! Help is on the way! Join us for a week of back-to-back M&S Education Program courses presented by the M&S Information Analysis Center's (MSIAC) M&S University instructors.

Start on Monday with "MS 101," the basic course that has been attended by thousands worldwide. Spend the next three days in the "M&S Staff Officer Course (MSSOC)," recognized everywhere as THE course to attend if you are new to M&S or wish to expand your M&S horizons. Follow the MSSOC with two acquisition-related tutorials: "M&S in Support of Research, Development, and Acquisition" and "M&S in Support of Test and Evaluation." Finish off the week with our "Acquisition M&S Workshop," a day learning how M&S is used throughout the life cycle of a new product.

Choose the course, or courses, you wish to attend—or attend them all! Courses will be presented in Alexandria, Va. Choose the times you wish to attend from four weeklong M&S education extravaganzas:

- *May 21-25*
- *June 11-15*
- *July 9-13*
- *August 20-24*

Download the registration form for the week you wish to attend from the MSIAC's M&S University Web site at *www.education.dmso.mil.*

For more information

Questions? Contact Tom Stanford, M&S University, at (703) 933-3343 or *tstanford@msiac.dmso.mil.*

ASK DMSO • ***ASK@dmso.mil***

Have a question about the DMSO, its programs or DoD M&S policy, but don't know who to call? Send your query to **ASK@dmso.mil**. We'll sort it out, send your question to the right people and get you an answer.

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